# Cold Trap

**Model**

# CA300/800

## Instruction Manual

- First Edition -

- Thank you for purchasing "Cold Trap, CA Series" of Yamato Scientific Co., Ltd.
- To use this unit properly, read this "Instruction Manual" thoroughly before using this unit.
  Keep this instruction manual around this unit for referring at anytime.

⚠WARNING!:
Carefully read and thoroughly understand the important warning items described in this manual before using this unit.

**Yamato Scientific Co. LTD.,**

This paper has been printed on recycled paper.

# Contents

## Explanation

### MEANING OF ILLUSTRATED SYMBOLS

#### Illustrated Symbols

Various symbols are used in this safety manual in order to use the unit without danger of injury and damage of the unit. A list of problems caused by ignoring the warnings and improper handling is divided as shown below.Be sure that you understand the warnings and cautions in this manual before operating the unit.

**⚠ WARNING!** If the warning is ignored, there is the danger of a problem that may cause a serious accident or even fatality.

**⚠ CAUTION!** If the caution is ignored, there is the danger of a problem that may cause injury/damage to property or the unit itself.

#### Meaning of Symbols

This symbol indicates items that urge the warning (including the caution).
A detailed warning message is shown adjacent to the symbol.

This symbol indicates items that are strictly prohibited.
A detailed message is shown adjacent to the symbol with specific actions not to perform.

This symbol indicates items that should be always performed.
A detailed message with instructions is shown adjacent to the symbol.

## Table of Illustrated Symbols

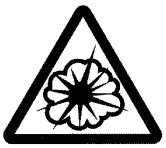
### Warning


Warning,
generally


Warning,
high voltage


Warning,
high temperature


Warning,
drive train


Warning,
explosive

### Caution


Caution,
generally


Caution,
electrical shock


Caution,
scald


Caution,
no road heating


Caution,
not to drench

Caution,
water only


Caution,
deadly poison

### Prohibit


Prohibit,
generally


Prohibit,
inflammable


Prohibit,
to disassemble


Prohibit,
to touch

### Compulsion


Compulsion,
generally


Compulsion,
connect to the
grounding
terminal

Compulsion,
install on a flat
surface


Compulsion,
disconnect the
power plug


Compulsion,
periodical
inspection

## Fundamental Matters of “WARNING!” and “CAUTION!”

# WARNING!

### Do not use this unit in an area where there is flammable or explosive gas

Never use this unit in an area where there is flammable or explosive gas.
This unit is not explosion-proof. An arc may be generated when the power switch is turned on or off, and fire/explosion may result. (Refer to page22 “List of Dangerous Substances”.)

### Always ground this unit

Always ground this unit on the power equipment side in order to avoid electrical shock due to a power surge.

### If a problem occurs

If smoke or strange odor should come out of this unit for some reason, turn off the power key right away, and then turn off the circuit breaker and the main power. Immediately contact a service technician for inspection. If this procedure is not followed, fire or electrical shock may result. Never perform repair work yourself, since it is dangerous and not recommended.

### Do not use the power cord if it is bundled or tangled

Do not use the power cord if it is bundled or tangled. If it is used in this manner, it can overheat and fire may be caused.

### Do not process, bend, wring, or stretch the power cord forcibly

Do not process, bend, wring, or stretch the power cord forcibly. Fire or electrical shock may result.

### Pay special attention to the measure for flammability and handling of flammable solvent

Leaving at the temperature higher than the room temperature may vaporize the flammable material (ethanol, etc.). There might be the case that some flammable liquid might be vaporized at the temperature lower than the room temperature. The result of such careless handling could cause the fire or explosion. Do provide the vaporization with enough during the operation.

### Do not disassemble or modify this unit

Do not disassemble or modify this unit. Fire or electrical shock or failure may be caused.

## Fundamental Matters of “WARNING!” and “CAUTION!”

### ⚠CAUTION!

| | |
|---|---|
| | **During a thunder storm** |
| During a thunderstorm, turn off the power key immediately, then turn off the circuit breaker and the main power. If this procedure is not followed, fire or electrical shock may be caused. | |

| | |
|---|---|
| | **Do not touch the condensed liquid in the cooling coil and trap bath** |
| Since the condensed liquid in the cooling coil and trap bath is stayed with low temperature, never touch it so as to preventing from getting frostbite on your hands. | |

| | |
|---|---|
| | **Do not touch the cooling fin with bare hands** |
| Do not touch the cooling fin with bare hands during maintenance, for the edge of the cooling fin is too sharp to cut your hand. | |

## Requirements for Installation

# WARNING!

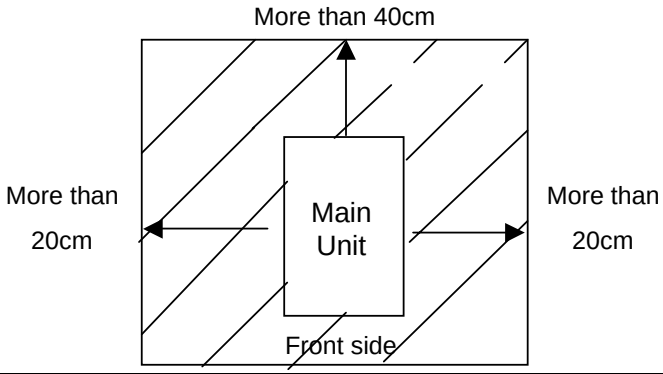
### 1. Always ground this unit

- Connect the power plug to a receptacle with grounding connectors.
- Do not forget to ground this unit, to protect you and the unit from electrical shock in case of power surge. Choose a receptacle with grounding connectors as often as possible.
- Do not connect the grounding wire to a gas pipe, or by means of a lightning rod or telephone line. A fire or electrical shock will occur.

### 2. Choose a proper place for installation

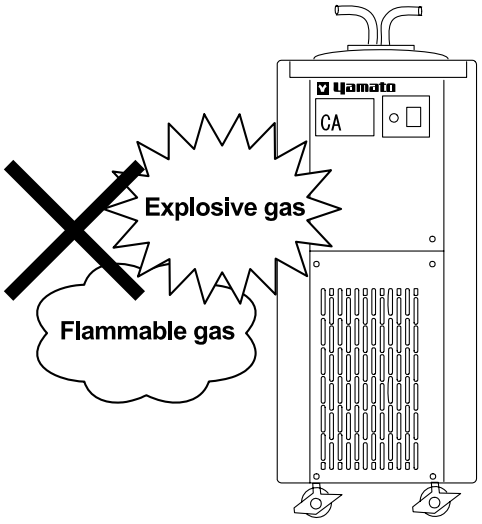
- Do not install this unit in a place where:
  - Rough or dirty surface.
  - Flammable gas or corrosive gas is generated.
  - Ambient temperature bellow 5℃ or above 35°C. (CA300)
  - Ambient temperature bellow 5℃ or above 30°C. (CA800)
  - Ambient temperature fluctuates violently.
  - There is direct sunlight.
  - There is excessive humidity and dust.
  - There is a constant vibration.

- Install this unit on a stable place with the space as shown below.




### 3. Do not use this unit in an area where there is flammable or explosive gas

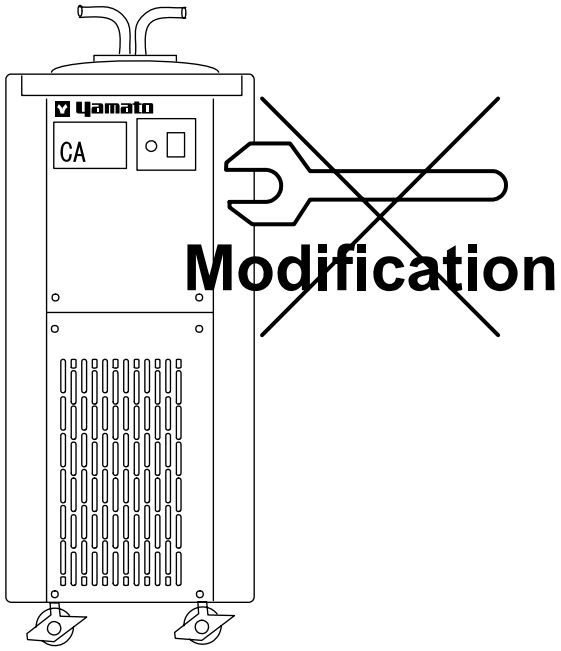
- Never use this unit in an area where there is flammable or explosive gas. This unit is not explosion-proof. An arc may be generated when the power switch is turned ON or OFF, and fire/explosion may result.
- To know about flammable or explosive gas refer to page22 “List of Dangerous Substances”.



## Requirements for Installation

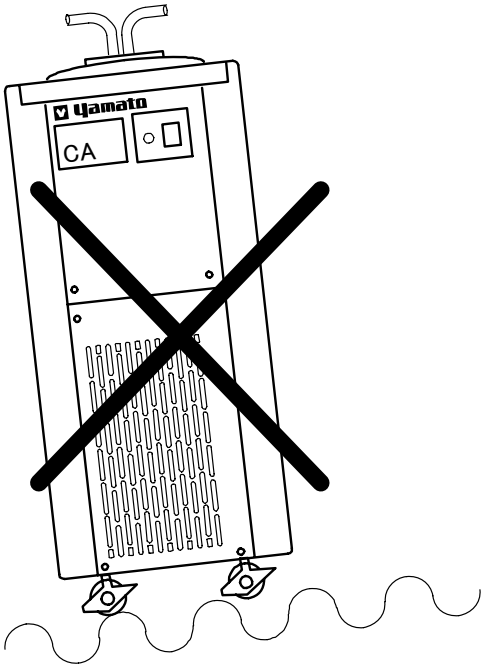
### 4. Do not modify

- Modification of this unit is strictly prohibited. This could cause a failure.




### 5. Do not topple or tilt this unit

- Set this unit to the flattest place. This unit incorporates the refrigerator. Do not topple or tilt it.



## Requirements for Installation

# ⚠CAUTION!

### 6. Use specified receptacle for power source

- Choose a correct power distribution board or receptacle that meets the unit's rated electric capacity.

**Electric capacity:** CA300: 100V AC, 50/60Hz, 6A
CA800: 100V AC, 50/60Hz, 10A

**NOTE)**
Starburst connection with a branching receptacle or extended wiring with a cord reel lowers electrical power voltage, which may cause the degradation of refrigeration capability.

### 7. Before/after installing

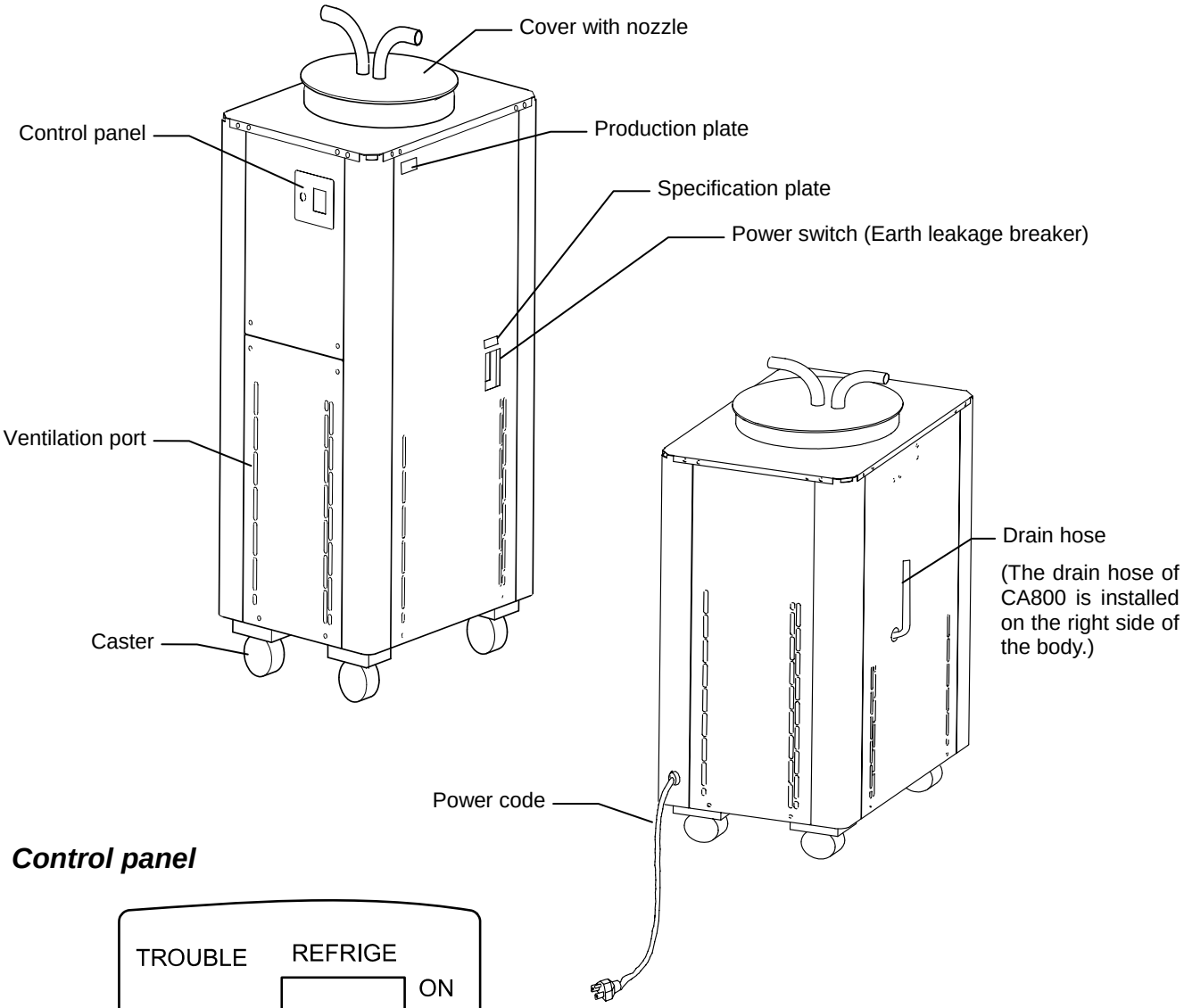
- It may cause injure to a person if this unit falls down or moves by the earthquake and the impact. etc..To prevent, take measures that the unit cannot fall down, and not install to busy place.
- Though this unit has the air-cooled refrigerator, the device exhausts the heat. Do provide the vaporization with enough so as not to raise the ambient temperature caused by the exhaust of the heat, or install this unit with its air controlled completely. If the ambient temperature becomes high, the operation efficiency becomes worse, and could cause the malfunction of the device by high temperature and humidity.

### 8. Handling of power code

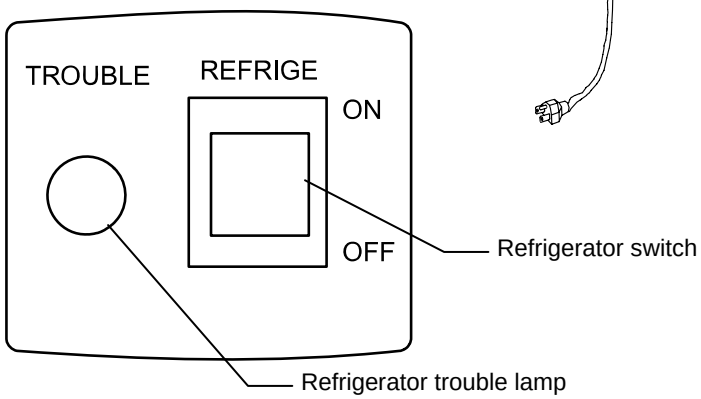
- Do not entangle the power cord. This will cause overheating and possibly a fire.
- Do not bend or twist the power cord, or apply excessive tension to it. This may cause a fire and electrical shock.
- Do not lay the power cord under a desk or chair, and do not allow it to be pinched in order to prevent it from being damaged and to avoid a fire or electrical shock.
- Keep the power cord away from any heating equipment such as a room heater. The cord's insulation may melt and cause a fire or electrical shock.
- If the power cord becomes damaged (wiring exposed, breakage, etc.), immediately turn off the power at the rear of this unit and shut off the main supply power. Then contact your nearest dealer for replacement of the power cord. Leaving it may cause a fire or electrical shock.
- Connect the power plug to the receptacl which is supplied appropriate power and voltage.

## Main Unit and Control panel

### *Main unit*




### *Control panel*




### *Function of each part*

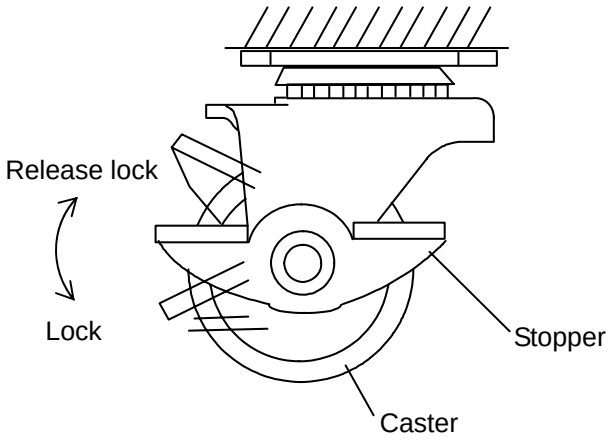
| Part Name | Function |
|---|---|
| Earth Leakage Breaker : | This is the power switch Turns ON/OFF the main power. |
| Refrigerator Switch : | The refrigerator activates by pressing “ON” of this switch. |
| Refrigerator Trouble Lamp : | This lamp lights on when the refrigerator is in overload. |

# Installation Method

1. Unlock the stopper of the caster.
   Pulling up the lever of the stopper for caster releases the lock.
   (Only the two casters in front of the unit are attached the stopped.)
2. Move the device to the place to be installed.

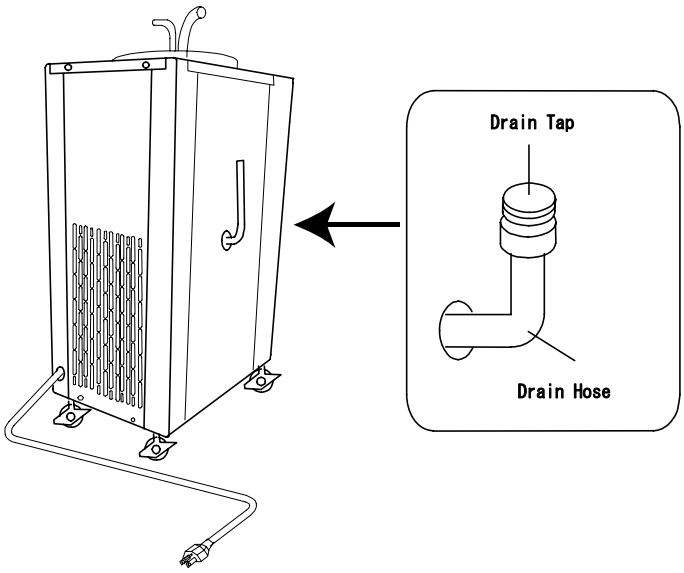
❖ If there is a step on the floor, the too strong impact is given to the caster, and could give the damage. In that case, move the device by lifting at the step.

3. When the installation place is determined, pull down the lever of the stopped for caster, and lock them.




4. Drain Tap Check

- Check whether the drain tap is detached or not.

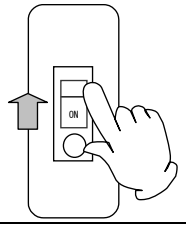
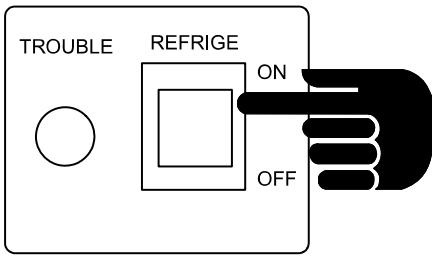
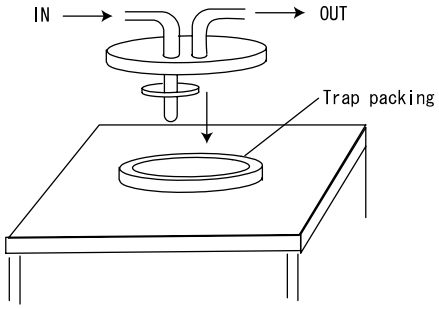
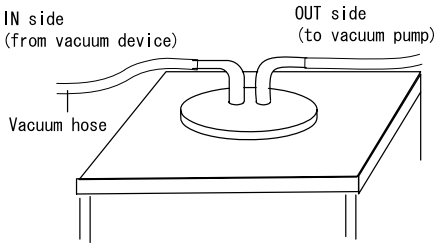
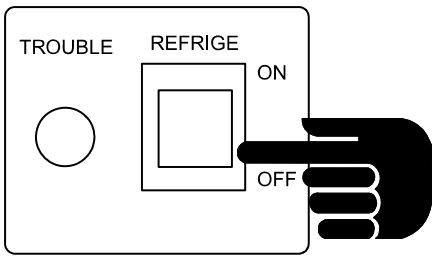



5. Power Plug Connection

- Check the power of the earth leakage breaker is turned "OFF", and plug the power cord in the receptacle.

## Procedure of Operation

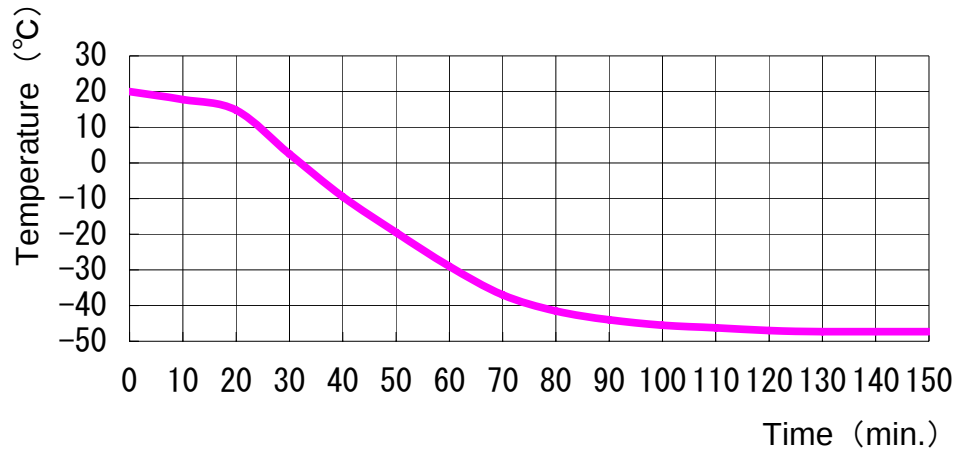
Read through the following procedure if the liquid to be trapped is water type.
Use the glass condenser set (optional accessory) for the acid or organic solvents. Refer to the operation manual attached to the glass condenser for using this glass condenser.

| | | |
|---|---|---|
| **1** | Supply the power<br>  | 1. Turn "ON" the earth leakage breaker. |
| | Operation of the refrigerator<br>  | 2. Turn "ON" the refrigerator switch. The refrigerator activates.<br>❖ There is the case that the starting sound of the refrigerator might become higher depending on the operation initial status and ambient temperature. However, this phenomenon is not abnormal. |
| **2** | Setting of cover with nozzle<br>  | 1. Check whether there is a dent or dust on the trap packing or cover with nozzle or not.<br>❖ If any dent or dust is detected, the vacuum degree of the inside of the trap bath becomes worse.<br>2. Mount the cover with nozzle on the trap packing as checking the "IN" and "OUT" of the nozzle direction.<br>❖ After setting the cover with nozzle, check the vacuum degree of the sealing parts. Insufficient sealing could cause the air leakage from the trap packing. |
| **3** | Vacuum hose connection<br>  | Connect the cover with nozzle with its "IN" side connected to vacuum equipment and with its "OUT" side connected to the vacuum pump using the vacuum hose.<br>❖ There is "IN" and "OUT" side for the cover with nozzle. Do not connect to inverse side.<br>❖ The vacuum hose is not an attached accessory. Prepare it by yourself. Apply the vacuum hose with the inner diameter 12mm or 15mm. |
| **4** | Operation of the vacuum pump | Turn "ON" the vacuum pump. The vacuum pump collects the steam from the vacuum equipment to the trap bath. |
| **5** | End of operation<br>  | 1. Stop operating the device.<br>2. Remove the vacuum hose from the cover with nozzle.<br>3. Turn "OFF" the vacuum pump.<br>4. Melt the ice in the trap leaving in the natural temperature or by pouring the hot water. After melted all ice, drain all the water from the device by removing the drain tap.<br>NOTE) Be sure to turn "OFF" the vacuum pump switch after turning back the pressure of the vacuum pump to normal one for preventing from the inverse flow of the oil. |

## Cooling Curve (Reference Data)

***CA300***

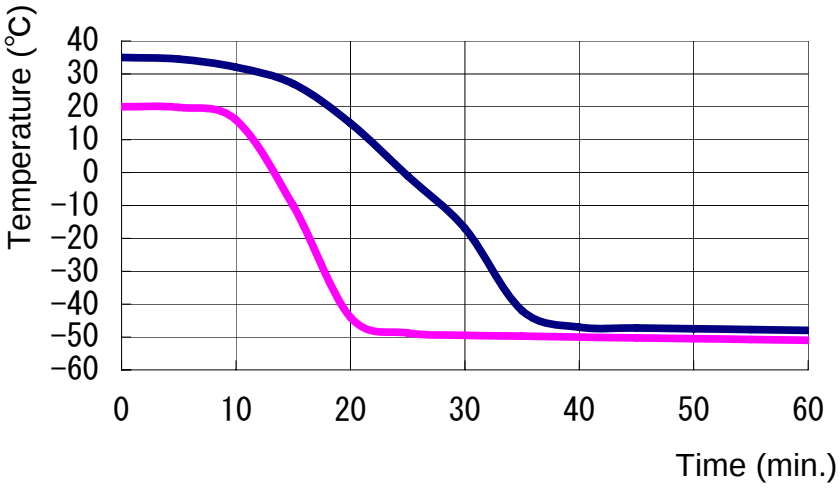
■ Ethanol 3liters




Under: 100V, 50Hz
Room temp: 20℃

Liquid temperature with three liters of ethanol in trap

■ Cooling part of the trap (surface)



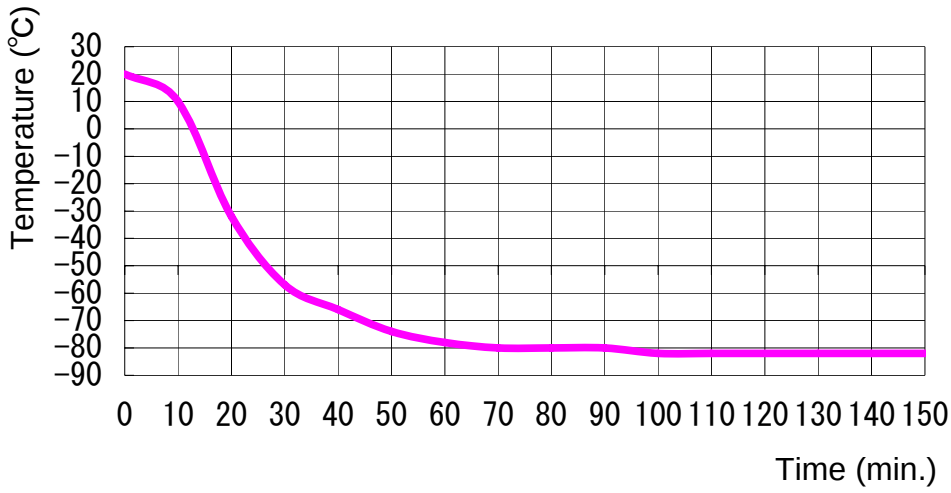

Under: 100V, 50Hz
Room temp: 35℃
Room temp: 20℃

Surface temperature of cooling coil

## Cooling Curve (Reference Data)

***CA800***

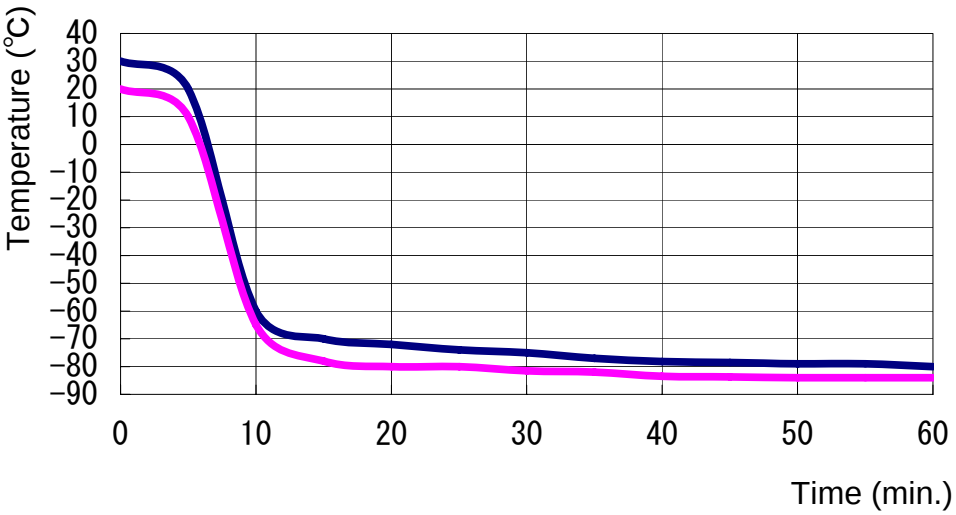
■ Ethanol 3liters




Under: 100V, 50Hz
Room temp: 20℃

Liquid temperature with three liters of ethanol in trap

■ Cooling part of the trap (surface)




Under: 100V, 50Hz
Room temp: 35℃
Room temp: 20℃

Surface temperature of cooling coil

# WARNING!

### If a problem occurs

If smoke or strange odor should come out of this unit for some reason, turn off the power key right away, and then turn off the breaker and the main power. Immediately contact a service technician for inspection. If this procedure is not followed, fire or electrical shock may result. Never perform repair work yourself, since it is dangerous and not recommended.

### Measure for flammability and handling of flammable solvent

This unit is not designed as the explosion-proof construction. Pay special attention to the handling of the sample to be handled with this unit on the consumption with the explosive material, flammable material, and similar ones. The flammable material may be vaporized by leaving it at the temperature higher than room temperature, and could cause the fire or explosion. When handling such material, provide ventilation with enough before the operation. (Refer to page22 “List of Dangerous Substances”.)

# CAUTION!

### Maximum trap capacity

The max. trap capacity for the water type liquid is around 0.9kg (CA300) or 0.8kg (CA800). Inserting too much trap to this unit could cause the clogging of "IN", "OUT" nozzle.

### Do not step on this unit

Do not step on this unit. It will cause injury if this unit fall down or break.

### Do not put anything on this unit

Do not put anything on this unit. It will cause injury if fall.

### During a thunder storm

During a thunderstorm, turn off the power key immediately, then turn off the circuit breaker and the main power. If this procedure is not followed, fire or electrical shock may be caused.

### Countermeasure for stop operation during night or long-term stop

In case of stopping operation during night or long-term, toggle the power switch to "OFF".

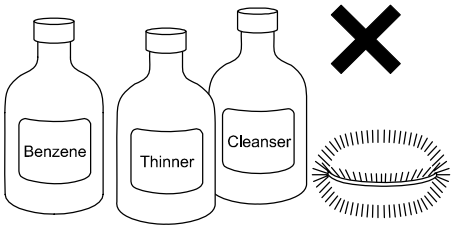
## Daily Inspection and Maintenance

### ⚠WARNING!

- Disconnect the power cable from the power source when doing an inspection or maintenance unless needed.
- Perform the daily inspection and maintenance after returning the temperature of this unit to the normal one.
- Do not disassemble this unit.
- Do not touch the cooling fin with bare hands.

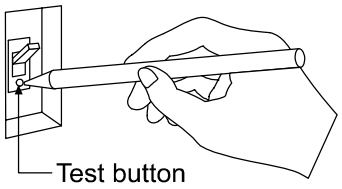
### ⚠CAUTION!

- Use a well-drained soft cloth to wipe dirt on this unit. Do not use benzene, thinner or cleanser for wiping. Do not scrub this unit. Deformation, deterioration or color change may result in.




### Monthly maintenance

- Check the earth leakage breaker function.
  1. Connect the power cord.
  2. Turn the breaker on.
  3. Push the red test switch by a ballpoint pen etc.
  4. If there is no problem, the earth leakage breaker will be turned off.



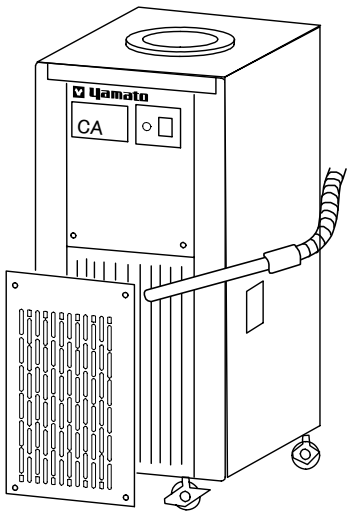

### Cleaning of cooling fin

- Clogging of the cooling fin could cause the deterioration of the cooling performance, and also cause the malfunction of the refrigerator. The clogged status differs depending on the surrounding condition or operation time. Clean the cooling fin periodically.

❖ Loosen the mounting screws (4 screws) of the ventilation port cover, remove the cover of the ventilation port, and remove the dust attached to the surface of the cover using the vacuum cleaner.

❖ After cleaning the cooling fin, attach it in inverse procedure.

⚠ Take care not to crush the fin during cleaning.




**For any questions, contact the dealer who you purchased this unit from, or the nearest sales division in our company.**

## When not using this unit for long term / When disposing

### ⚠CAUTION!

**When not using this unit for long term…**

- Turn off the power and disconnect the power cord.

### ⚠WARNING!

**When disposing…**

- Keep out of reach of children.
- Treat as large trash.

***Environmental protection should be considered***

We request you to disassemble this unit as possible and recycle the reusable parts considering to the environmental protection. The feature components of this unit and materials used are listed below.

| Component Name | Material | |
|---|---|---|
| **Parts of Main Unit** | | |
| Casing | Bonderizing steel plate baked with melamine resin coating | |
| Inner bath, Cover | Stainless steel SUS304 | |
| Production plates | Polyester (PET) resin film | |
| Corner | Alkylbenzenesulfied (ABS) resin | |
| Trap packing | Silicon rubber | |
| **Electrical Parts** | | |
| Switches, Relays | Composites with resin and others | |
| Power cord & wiring materials and others | Composites with synthetic rubber, copper, nickel and others | |
| **Parts of Refrigeration System** | | |
| Refrigerator unit | Iron, Synthetic oil and others | |
| Cooling fin | Aluminum, Copper | |
| **Parts of Piping** | | |
| Drain hose | Natural rubber | |
| Drain tap | Polyacetal | |
| Drain tap holder | Bonderizing steel plate baked with melamine resin coating | |
| Pipe cover | Polyurethane sponge | |
| Pipe | Copper | |
| **Sealed Cooling Medium for Refrigerator** | | |
| Cooling medium | R404A | Ask the specialist for the dealing of cooling medium. |
| | HFC23 | |

## Trouble Shooting

| Condition | Possible Causes |
|---|---|
| The device does not start when turning on the power switch. | • Power plug is not connected to the receptacle correctly.<br>• Power failure.<br>• Earth leakage breaker is turned to “OFF” |
| Not fallen the temperature. | • The cooling fin is clogged.<br>• The cooling liquid is overheated.<br>• The ambient temperature is exceeding 30℃(CA800) or 35℃ (CA300).<br>• The peripheral of the ventilating port is shut down. |

## In lighting on the lamp,

| Error Sign | Cause | Remedy |
|---|---|---|
| Turned on the refrigerator trouble lamp | Overload of refrigerator | • Immediately turn off the power, remove the cause of the error referring to the "Trouble Shooting" (Not fallen the temperature) above, and turn on the power again after passing the certain time.<br>• In case of lighting the alarm lamp again, make a call to the service office. |

**In the case if the error other than listed above occurred, turn off the power switch and primary power source immediately. Contact the shop of your purchase or nearest Yamato Scientific Service Office.**

## In Case of Request for Repair

If the failure occurs, stop the operation, turn OFF the power switch, and unplug the power plug. Please contact the sales agency that this unit was purchased, or the Yamato Scientific's sales office.

**< Check following items before contact >**

- ◆ Model Name of Product
- ◆ Production Number
- ◆ Purchase Date

} See the production plate attached to this unit.

- ◆ About Trouble (in detail as possible)

## Minimum Retention Period of Performance Parts for Repair

The minimum retention period of performance parts for repair of this unit is 7 years after discontinuance of this unit.
The "performance part for repair" is the part that is required to maintain this unit.

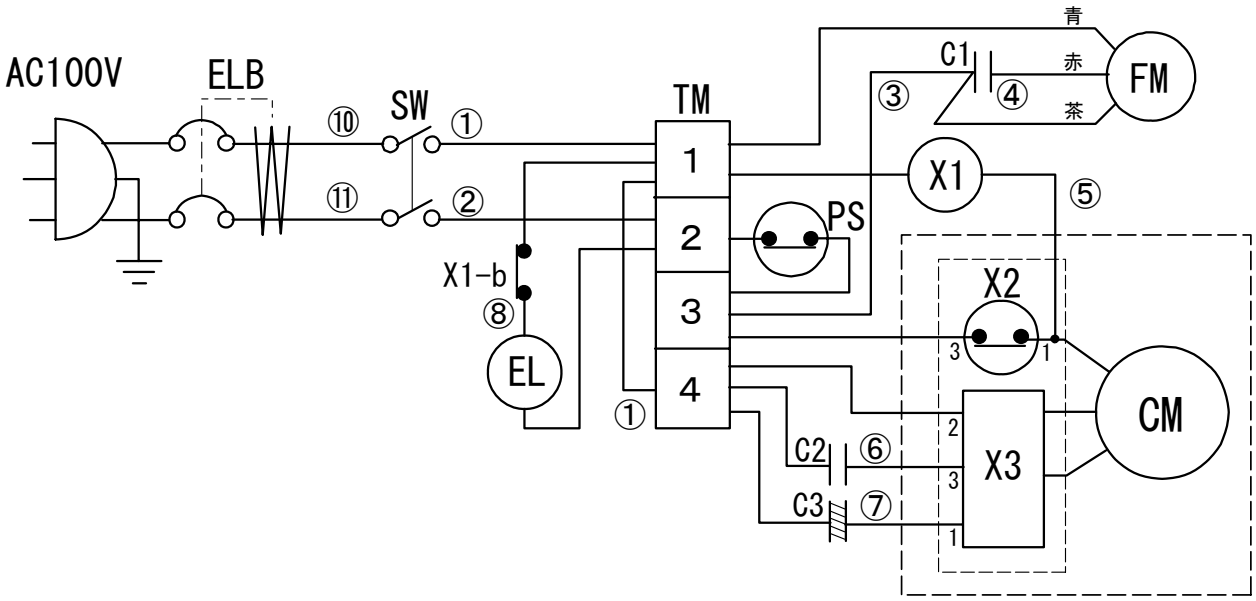
# Specification

| Model | | CA300 | CA800 |
|---|---|---|---|
| Method | | Direct Trap or glass trap (Optional accessory) | |
| Performance | Dehumidifying capacity | Max. 0.9Kg (Water type liquid) | Max. 0.8Kg (Water type liquid) |
| | Lowest reached temperature | -45℃ | -80℃ |
| | Time required to reach lowest temperature | 20min. | 30min. |
| Configuration | Refrigerator | Air cooling, 300W | Air cooling, 350W × 2 |
| | Cooling medium | R404a | R404a/R23 |
| | Cooling coil | Inner diameter: 90mm, SUS304 | |
| | Cover | SUS304, Outer diameter: 17.6mm, with nozzle | |
| | Bath material | SUS304, Cylindrical | |
| | Dimensions of bath | ϕ153 × H235mm | |
| | Capacity | Approx. 4L (liquid quantity: 3L) | |
| | Usable ambient temperature | 5 to 35℃ | 5 to 30℃ |
| Standards | External dimensions | W284 × D404 × H700 mm | W405 × D455 × H850 mm |
| | Weight | Approx. 32Kg | Approx. 54Kg |
| | Power supply | 100V AC, 50/60Hz, 6A | 100V AC, 50/60Hz, 10A |
| Accessory | | Instruction manual | |

## Optional Accessories (common for CA300/800)

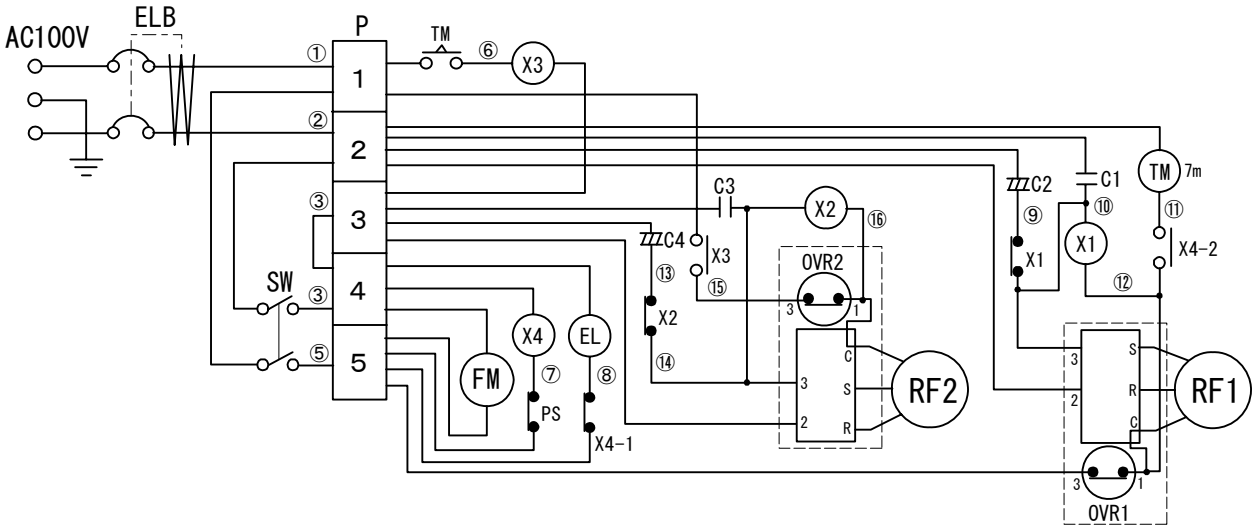
| Name | | Product code | Notes |
|---|---|---|---|
| Glass condenser set OCA10 | | 2221487 | Collection of acid and organic solvents |
| Tube with different dia. for rubber tube | Brass ϕ30 × ϕ18 | 242185 | For joint of parts with different diameter |
| | Brass ϕ18 × ϕ12 | 242186 | |
| | SUS ϕ30 × ϕ18 | 241496 | |
| | SUS ϕ18 × ϕ12 | 241497 | |
| Cover made of SUS | | 200000 | Cover of trap bath |

**CA300**




| Symbol | Part name | Symbol | Part name |
|---|---|---|---|
| ELB | Earth leakage breaker | PS | Pressure switch |
| SW | Refrigerator switch | C1 | Operation condenser (FM) |
| TM | Terminal block | C2 | Operation condenser (CM) |
| EL | Trouble lamp | C3 | Start condenser |
| X1 | Relay | FM | Fan motor |
| X2 | Overload relay | CM | Compressor motor |
| X3 | PTC start relay | | |

## CA800




| Symbol | Part name | Symbol | Part name |
|---|---|---|---|
| ELB | Earth leakage breaker | OVR1, OVR2 | Overload relay |
| SW | Refrigerator switch | C1, C3 | Operation condenser |
| TM | Terminal block | C2, C4 | Start condenser |
| EL | Trouble lamp | TM | Time relay |
| X1, X2 | Start relay | FM | Fan motor |
| X3, X4 | Relay | RF1, RF2 | Refrigerator |
| PS | Pressure switch | | |

# Replacement Parts Table

## CA300

| Part Name | Code No. | Specification | Manufacturer |
|---|---|---|---|
| Packing | CA300-30150 | Silicon | Yamato Scientific |
| Refrigerator unit | 3-01-003-6005 | 100V/300W UF-NS300L-YL | Yamato Scientific |
| Capillary | 3-07-002-0004 | Inner dia. $\phi$0.8 × outer dia. $\phi$1.8 | Yamato Scientific |
| Refrigerator switch | 2-01-027-0005 | HLN215A | Fujisoku |
| Trouble lamp | 2-09-006-0001 | BN-5701 | Satoh Parts |
| Earth leakage breaker | 2-06-000-0019 | FG32R/15-30MA15A | Fuji Denki |
| Relay | 2-05-008-0003 | AP3124K | Matsushita |
| Drain hose | 3-04-001-6022 | $\phi$6 × $\phi$18 | Yamato Scientific |
| Terminal block | LT00035672 | MKH-250ABC-4P | Terminal |
| Drain tap | CA300-40200 | Polyacetal | Yamato Scientific |

## CA800

| Part Name | Code No. | Specification | Manufacturer |
|---|---|---|---|
| Packing | CA300-30150 | Silicon | Yamato Scientific |
| Refrigerator switch | 2-01-027-0005 | HLN215A | Fujisoku |
| Trouble lamp | 2-09-006-0001 | BN-5701 | Satoh Parts |
| Earth leakage breaker | 2-06-000-0019 | FG32R/15-30MA15A | Fuji Denki |
| Drain hose | 3-04-001-6022 | $\phi$6 × $\phi$18 | Yamato Scientific |
| Drain tap | CA300-40200 | Polyacetal | Yamato Scientific |
| Compressor | 3-01-006-0005 | C-2SN350LOR HFC23/R404A | Yamato Scientific |
| Oil separator | 3-19-000-0003 | OUB-1-S-3 | Yamato Scientific |
| Pressure switch | 3-18-000-0006 | VFP-F | Fuji Kohki |
| Condenser | CA800-30140 | | Yamato Scientific |
| Fan motor | 3-01-006-0006 | SE4-CO41NP | Sanyo |
| Charge bulb | 3-25-001-0002 | | Yamato Scientific |
| Dryer | 3-20-003-6002 | KC-10432 | Meikoh Kiki |
| Terminal block | LT00035673 | MKH-250ABC-5P | Terminal |
| Relay | 2-05-008-0002 | AP3124K | Matsushita |
| Relay | 2-05-000-0035 | LY2F AC100V | Omron |
| Time relay | 2-05-000-0053 | ADX11134 | Matsushita |
| Socket | 2-05-008-1004 | AP3822K | Matsushita |
| Vacuum hose | 3-04-001-6022 | $\phi$6 × $\phi$18 | Yamato Scientific |

## List of Dangerous Substances

Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients in this unit.

### EXPLOSIVE

| | |
|---|---|
| **EXPLOSIVE:** | Ethylene glycol dinitrate (nitro glycol), Glycerin trinitrate (nitroglycerine), Cellulose nitrate (nitrocellulose), and other explosive nitrate esters |
| | Trinitrobenzene, Trinitrotoluene, Trinitrophenol (picric acid), and other explosive nitro compounds |
| | Acetyl hidroperoxide (peracetic acid), Methyl ethyl ketone peroxide, Benzyl peroxide, and other organic peroxides |

### FLAMMABLE

| | |
|---|---|
| **IGNITING:** | Lithium (metal), Potassium (metal), Sodium (metal), Yellow phosphorus, Phosphorus sulfide, Red phosphorus, Celluloid compounds, Calcium carbide, Lime phosphate, Magnesium (powder), Aluminum (powder), Powder of metals other than magnesium and aluminum, Sodium hydrosulfite |
| **OXIDIZING:** | Potassium chlorate, Sodium chlorate, Ammonium chlorate, and other chlorate |
| | Potassium perchlorate, Sodium perchlorate, Ammonium perchlorate, and other perchlorate |
| | Potassium peroxide, Sodium peroxide, Barium peroxide, and other inorganic peroxide |
| | Potassium nitrate, Sodium nitrate, Ammonium nitrate, and other nitrate |
| | Sodium chlorite and other chlorites |
| | Calcium hypochlorite and other hypochlorites |
| **INFLAMMABLE LIQUID:** | Ethyl ether, Gasoline, Acetaldehyde, Propylene chloride, Carbon disulfide, and other flammable substances having a flash point of lower than -30℃ |
| | Normal hexane, ethylene oxide, acetone, benzene, methyl ethyl ketone, and other flammable substances having a flash point of -30℃ or higher but lower than 0℃ |
| | Methanol, Ethanol, Xylene, Pentyl acetate (amyl acetate), and other flammable substances having a flash point of 0℃ or higher but lower than 30℃ |
| | Kerosene, Light oil (gas oil), Oil of turpentine, Isopentyl alcohol (isoamyl alcohol), Acetic acid, and other flammable substances having a flash point of 30℃ or higher but lower than 65℃ |
| **FLAMMABLE GAS:** | Hydrogen, Acetylene, Ethylene, Methane, Propane, Butane, and other flammable substances which assume a gaseous state at 15℃ and 1 atm |

(Source: Appendix Table 1 of Article 6 of the Industrial Safety and Health Order in Japan)

## Responsibility

Please follow the instructions in this document when using this unit. Yamato Scientific has no responsibility for the accidents or breakdown of device if it is used with a failure to comply.
Never conduct what this document forbids. Unexpected accidents or breakdown may result in.

## Note

- The contents of this document may be changed in future without notice.
- Any books with missing pages or disorderly binding may be replaced.

Instruction Manual for

**Cold Trap**
**Model CA300/800**

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